OOKLA

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September 6, 2016

The Honorable Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

RE: *Ex Parte* Submission
        Protecting and Promoting the Open Internet, Guidance on Open Internet Transparency
        Rule Requirements, GN Docket No. 14-28
        Nineteenth Annual Report on the State of Mobile Wireless Competition, WT Docket No.
        16-137

Dear Ms. Dortch:

        Ookla, LLC ("Ookla") writes in regard to the above-referenced proceedings[1] to
respectfully request that the Federal Communications Commission ("FCC" or "Commission")
take action to use additional data sources when evaluating the performance of wireless
networks in light of the questions surrounding the Mobile Measuring Broadband America
("MMBA") program.[2] Ookla is privileged to partner with thousands of businesses,
governmental entities, universities and non-profit organizations, and appreciates this
opportunity to comment on the instant proceedings. Ookla is hopeful that the Commission will
reevaluate its current approach given that reliance on diverse data sources would undoubtedly
optimize research results and policy outcomes.

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[1] *See Guidance on Open Internet Transparency Rule Requirements*, Public Notice, DA 16-569, GN Docket No.
14-28, 31 FCC Rcd 5330 (2016); *Wireless Telecommunications Seeks Comment on the State of Mobile Wireless
Competition*, DA 16-450, WT Docket No. 16-137, 31 FCC Rcd 3848 (2016).

[2] *See e.g.*, Letter from CTIA and CCA to Ms. Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 14-28 and 12-
264, WT Docket No. 16-137 (filed Aug. 10, 2016).

As discussed below, Ookla's consumer-initiated internet test captures real-world network connection data on the devices and in the places where consumers actively use the internet. Ookla builds technology that empowers people to understand and improve the internet. Ookla appreciates and supports the Commission's efforts to fulfill the objectives of the Open Internet Order of 2015[3] and strongly believes that the associated task of testing mobile network speeds would benefit greatly from test result information culled from an array of sources. Moreover, Ookla stands ready to assist the Commission in any way possible, and will be pleased to provide its data as an additional information source.

Ookla: A demonstrated authority on internet accessibility and performance. By way of brief background, Ookla was established in 2006 by a small team of internet and technology veterans. Consistent with the founders' strong belief that individual consumers should have easy and direct access to information about their network connections and service providers, Ookla has developed applications while keeping in mind the importance of putting "consumers first." Ookla's suite of Speedtest® applications provide consumers with accurate information about the performance and accessibility of their internet connections, and are relied upon by consumers in over 200 countries, with over eight million tests being run each day.

With more than nine billion consumer-initiated tests recorded to date, Ookla has gathered a comprehensive data set about consumers' network connections and is uniquely positioned to provide an authoritative view of internet accessibility and performance. Ookla's solutions have been widely adopted and leveraged by wireline and wireless broadband internet service providers worldwide.

Consumer-initiated testing is superior to other testing methods. As noted above, Ookla's applications empower consumers to accurately test their internet connection at any time while using their own devices from locations where they actually use the internet. Ookla refers to this method as "consumer-initiated testing" because consumers are given the flexibility to initiate Speedtest® at any time, in any location—whether it be in homes, shopping centers, workplaces, parks, airports, as passengers in cars, on trains, or on buses, and while in one place or on the move. As a result, Ookla has no need to extrapolate data to fill in gaps because its applications collect information from every imaginable location and every type of device at all hours of the day.

Speedtest®, a dedicated and thorough connectivity test, runs for approximately 30 to 60 seconds, which ensures an accurate maximum throughput result. Speedtest® saturates a connection using multiple parallel TCP (Transmission Control Protocol) threads and measures latency, download speed, upload speed, packet loss, jitter and a wide range of other diagnostic metrics. As a result of these tests, Ookla is also able to determine areas where connectivity does not exist, or when connectivity rapidly changes from moment to moment. Ookla's suite of

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[3] *See Protecting and Promoting the Open Internet*, GN Docket No. 14-28, 30 FCC Rcd 5601 (2015).

consumer applications rely on a network of over 5,000 geographically-distributed servers that capably measure speeds up to a gigabit. When a consumer runs any Speedtest® application, the technology automatically conducts the test through an optimal server located in close proximity to the consumer. This critical distinction ensures consistently accurate results, whereas other vendors frequently rely on a much smaller set of testing servers.

Consumers have run Speedtest® on tens of thousands of different device models, across billions of individual locations worldwide. Ookla processes and makes all results available for analysis on a daily basis, enabling providers to see the state of the internet in near real-time. By contrast, other vendors must rely on datasets collected, aggregated and analyzed over the course of months or even up to a year in order to achieve statistical significance. Given the dynamic nature of networks, by the time that data is published or shared, it is likely obsolete.

There is no better way to understand the true dynamics of network performance than to use real-world data. Other vendors employ methods that attempt to reproduce the consumer experience by using a subset of available devices and/or a much smaller sample set of actual tests. No other method is truly representative of what consumers actually experience on their own devices and in all of the places where they use the internet. They are, instead, a simulated and extrapolated model of connectivity; merely indicative, rather than representative, of the actual consumer experience.

Unlike those vendors who use dedicated test hardware or whose applications run on mobile devices alone, Speedtest® applications are available on a multitude of devices, including tablets, laptops, desktop computers, TVs, network routers, Wi-Fi access points, and network testing appliances. Speedtest® applications are optimized for each platform to ensure accurate and reliable results, regardless of the device used for testing.

Consumer-initiated testing is more reliable than drive testing. Developed during the early days of cellular telephones, drive testing measured call quality and signal performance for car phone users. Drive testing was later adapted in an attempt to measure cellular internet performance; however, the drive testing process still relies on driving lab test vehicles around vast geographic areas. Fundamentally, drive-testing is limited to data collected in areas where cars can drive. According to the American Road and Transportation Builders Association estimates,[4] roads comprise just six-tenths of one percent of the total land area of the contiguous United States. Testing only from roads therefore excludes the vast majority of locations where consumers access the internet.

Even if a vendor possessed a fleet of vehicles numbering in the dozens, drive testing does not produce a technically comprehensive data set within a reasonable amount of time. Here again, such data is likely outdated by the time the analysis of the test results is

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[4] _See_ http://www.artba.org/about/faq/.

completed, typically many months later. Moreover, drive test methods rely on test hardware that does not represent the tremendous variety of devices that actual consumers use.

Additionally, drive testing cannot measure how connectivity changes throughout the day, as the test vehicles drive through an area at a specific time, and do not measure each area during all hours of the day. This also means that drive testing results are heavily influenced by momentary, abnormal fluctuations in network performance that might just happen at the single moment a drive test occurs.

Consumer-initiated testing is more thorough than background testing. Some vendors rely on background testing applications, which, when installed on a consumer's device, run periodic background tests whenever the device is on. Given its indiscriminate nature, background testing is unavoidably flawed. The tests run at any and all times and thus do not necessarily coincide with a time when the consumer would actually access the internet. For example, background tests can occur when devices are in pockets, in the bottom of backpacks, in gym lockers, inside a nightstand, or in a sub-level parking garage, each of which is a situation where data is affected by signal attenuation.

Moreover, it is important to note that background testing surreptitiously collects data about the consumer's use of the device at regular intervals. In collecting user data regularly throughout a 24-hour day—including the user's location, application usage and other potentially personally identifiable information—background testing may present a privacy concern. Apple does not permit applications that perform the functions required by background testing applications in its popular iOS App Store. Background test results, therefore, do not include data associated with the millions of consumers using Apple devices, which is approximately 40 percent of U.S. smartphone users.[5]

Consumer-initiated testing is superior to passive testing. Passive testing is a form of background testing that monitors the network usage of other applications on the mobile device itself. Such testing methods do not measure the full capability of the internet connection, but only the throughput afforded to a specific service or application. Given that passive testing at its very nature runs in the background and is not a dedicated, standalone test, any data collected through background testing does not and cannot measure the full throughput of an internet connection.

In addition, given that background and passive testing is available on a number of devices that is magnitudes smaller than the number used by Ookla Speedtest® consumers, the resulting data is limited. Testing a smaller sample yields imprecise results, which are merely deduced—and only after extrapolation. Thus, any "conclusions" based on such a small sampling would merely infer, rather than conclusively reflect, the performance and availability of a given network.

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[5] _See_ http://www.parksassociates.com/blog/article/pr-02102016-mwc.

Ookla's data set is comprehensive and accurate. Ookla's Speedtest® applications measure all types of network connections, including fixed broadband, LANs, local wireless networks and cellular connections. In 2015, Ookla consumers undertook tests in areas covering 613,401 square miles of the United States. By comparison, the land use estimates from the most recent U.S. Department of Agriculture survey reveal that the majority of Americans live in 94,628 square miles of the U.S.[6] Thus, Speedtest® captures data for an array of areas—not only those where most Americans live.

With respect to measuring mobile consumers specifically, Speedtest® yields statistically meaningful data for 100 percent of the Commission's Cellular Market Areas ("CMAs"). Ookla's Speedtest® data covering the period from January through June 2016 reveals that, on average, consumers initiated over 122,000 tests per CMA, using a median of more than 7,300 unique devices per CMA.

Conclusion. The Commission has a duty to all stakeholders to ensure the completeness and accuracy of broadband network performance testing. Transparency, together with reliance on diverse data sources, optimizes research results and policy outcomes and leads to the innovation and competition that benefit consumers. Wireless consumers will only benefit from the Commission's use of additional data sources in connection with its evaluation of network performance.

Respectfully submitted,

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[6] *See* Major Uses of Land in the United States, 2007, Economic Information Bulletin No. 89, Economic Research Service, U.S. Dept. of Agriculture (Dec. 2011). http://www.ers.usda.gov/media/188404/eib89_2_.pdf.